

Regulatory Updates on Alternative Refrigerants for MVACs

Yaidi Cancel

U.S. Environmental Protection Agency

SAE Automotive Refrigerant and System

Efficiency Symposium, Scottsdale, AZ

July 13, 2010



Overview

- Background on the Significant New Alternatives Policy (SNAP) Program
- Alternative refrigerants for Motor Vehicle Air Conditioning (MVAC) systems
- Status of rules for alternative refrigerants
 - CO₂
 - HFO-1234yf

Significant New Alternatives Policy (SNAP) Program

- **Part of U.S. response to Montreal Protocol**
- **Section 612 of the Clean Air Act**
 - Manufacturers are required to submit information to EPA on substitutes for ozone-depleting substances (ODS) before sale in US
 - Directs EPA to evaluate alternatives
 - Find acceptable those that reduce overall risk to human health and the environment

Significant New Alternatives Policy (SNAP) Program

- **Types of Decisions under the SNAP Program**



Acceptable

- Listed in Federal Register (Notice of Acceptability)



Acceptable subject to use conditions



Acceptable subject to narrowed use limits



Unacceptable

Rulemaking Required

SNAP Process

Public or
confidential

EPA internal

SNAP Application Submitted by:
Refr. Producer, MVAC Mfr, EPA, Anyone

SNAP Team Reviews

Need Additional Info?

SNAP Team Reviews, Drafts Decision

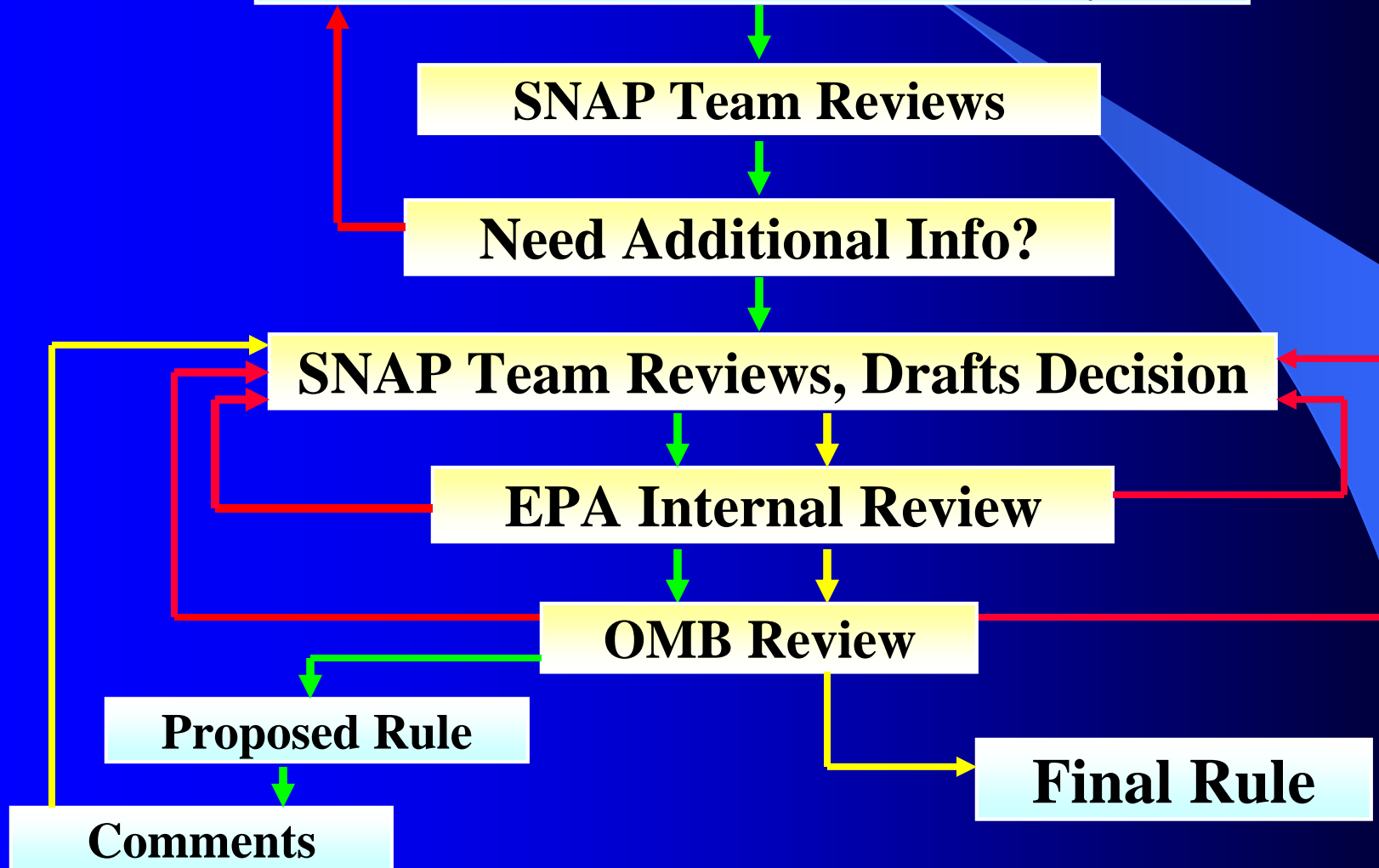
EPA Internal Review

OMB Review

Proposed Rule

Comments

Final Rule



What Alternatives are Already Acceptable under SNAP?

- **Listed substitutes in passenger cars & light duty vehicles (e.g. HFC-152a)**
 - Go to SNAP's website:
 - <http://www.epa.gov/ozone/snap/>
- **IMPORTANT:**

All MVAC refrigerants must be used with specified unique fittings and labels

What New Alternative is Already Acceptable under SNAP?

- **HFC-152a**

- Non-ODS, low GWP flammable refrigerant
- Found acceptable subject to use conditions in June 12, 2008 for new vehicles (73 FR 33304)
 - Use conditions:
Systems must be designed to avoid occupant exposure to concentrations above 3.7% in the passenger cabin free space for > 15 sec.

What Else May be Added Soon into the SNAP List for MVACs?

- **CO₂**

- Proposed subject to use conditions on September 14, 2006 (71 FR 55140)
- Announcement of data availability issued on September 17, 2009 (74 FR 47774)

- **HFO-1234yf**

- Proposed subject to use conditions on October 19, 2009 (74 FR 53445)

SNAP Proposed Rule on CO₂

- **Proposed use conditions:**

- Engineering strategies to ensure exposure in passenger cabin remains < 3.0% over 15 min
- Manufacturers must meet requirements of SAE J639 (i.e. unique fittings, warning label)

- **EPA took additional comments on:**

- Should there be ceiling limit on exposure of 4.0%?
- Should use condition on exposure apply only when ignition is on?

SNAP Proposed Rule on HFO-1234yf

- **Proposed use conditions:**

- Engineering strategies and/or devices must be incorporated into the [HFO-1234yf MVAC] system:
 - Such that leaks into the free space of the passenger compartment do not result in $> 6.2\%$ HFO-1234yf in any part of the free space > 15 seconds
 - Such that leaks into engine compartment or vehicle electric power source areas do not result in $< 6.2\%$ HFO-1234yf for any period of time
 - 6.2% is lower flammability limit

SNAP Proposed Rule on HFO-1234yf

- **Proposed use conditions (*continued*):**

HFO-1234yf MVAC systems must incorporate protective devices, isolation and/or ventilation techniques:

- in areas where processes, procedures or upset conditions such as leaks have the potential to generate HFO-1234yf concentrations > 6.2%
- in proximity to exhaust manifold surfaces and hybrid/electric vehicle electric power sources

SNAP Proposed Rule on HFO-1234yf

- **Proposed use conditions (*continued*):**

- HFO–1234yf MVAC systems must adhere to all the safety requirements of SAE J639:
 - unique fittings
 - flammable refrigerant warning label
 - high-pressure compressor cutoff switch
 - pressure relief devices
- Manufacturers must conduct and keep on file Failure Mode and Effect Analysis (FMEA) as stated in SAE J1739

Major Comments on the HFO-1234yf SNAP Proposal

- Environmental and health risk concerns
 - TFA, HF, ground-level ozone formation, flammability, toxicity
- Proposed use conditions and suggested alternative protective strategies
- CRP1234 results

More on EPA Rules on HFO-1234yf

- EPA proposed a Significant New Use Rule [(SNUR), 75 FR 4983 & 75 FR 16706]:
 - Requires submission of SNUN to EPA 90 days before using substance in activities designated as significant new use in the rule
 - Addresses potential health concerns about significant inhalation exposure to consumers servicing their own MVAC systems
 - Complements the SNAP rule
 - Comment period closed

More on EPA Rules: Status of New MVAC Alternatives

- **CO₂**
 - Proposed acceptable with use conditions for new motor vehicles
 - Comment period closed
 - Final rule is under development
 - Anticipated final rule publication:
Winter 2010

More on EPA Rules: Status of New MVAC Alternatives

- **HFO-1234yf**

- SNAP

- Proposed acceptable with use conditions for new motor vehicles
- Comment period closed
- Final rule under development
- Anticipated final rule publication: Fall 2010

- SNUR

- Comment period closed
- Final rule under development
- Anticipated final rule publication: Winter 2010

For More Information:

- **CO₂ (SNAP):**
 - Yaidi Cancel, (202) 343-9512
Cancel.Yaidi@epa.gov
Docket: EPA-HQ-OAR-2004-0488
- **HFO-1234yf (SNAP):**
 - Margaret Sheppard, (202) 343-9163
Sheppard.Margaret@epa.gov
Docket: EPA-HQ-OAR-2008-0664
- **HFO-1234yf (SNUR):**
 - Kenneth Moss, (202) 564-9232
Moss.Kenneth@epa.gov
Docket: EPA-HQ-OPPT-2008-0918

SNAP website: <http://www.epa.gov.ozone/snap/>

Why SAE Standards are Important?

- Safety guidelines
- Widely used in MVAC industry
- EPA encourages the development of safe design and safety practices
- EPA often cites SAE standards in regulations
 - e.g., SAE J639 for safety requirements for alternative refrigerants